TABLE B-3. DEMOGRAPHIC CHARACTERISTICS OF STABLE, ATTRITION, AND ACCRETION SAMPLES

Variable	Stable	Attrition	Accretion
Age of Contract Holder (Mean)	45.6	37.4	34.3
Percent Annuitants	24.6	7.3	3.8
Percent Female	30.6	37.8	47.6
Family Size (Mean)	2.9	2.6	2.2

The effect of the adjustment varies, however, with the reason for leaving the plan (see Table B-4). Those who left the plan to enter another federal plan remained $182 (22 percent) below the stable sample, as compared to $273 (33 percent) before adjustment. In contrast, terminations--which include deaths--showed expenses $61 (7 percent) higher than the stable sample after adjustment. The remainder of the attrition sample had expenses $117 (14 percent) lower than the stable sample after adjustment.

TABLE B-4. DIFFERENCES IN EXPENSES BETWEEN ATTRITION GROUPS AND STABLE SAMPLE, BEFORE AND AFTER DEMOGRAPHIC ADJUSTMENTS (In 1977 Dollars and Percentages)

	Group			
	All Leaving	Changed to Other Plan	Terminated	Other
Before Adjustment				
Dollars	-209	-273	-160	-181
Percent	-25	-33	-19	-22
After Adjustment				
Dollars	-80	-182	+61	-117
Percent	-10	-22	+7	-14

NOTE: A minus (-) indicates that the group had lower expenses than the stable sample.

How Much Bias Does Attrition Cause Within a Single Year?

The analysis above indicates the degree to which those who leave the data base differ from those who remain, but it does not directly indicate the amount of bias caused by attrition. The amount of bias depends not only on the differences in expenses between the attrition and stable samples, but also on the frequency of attrition.

In this section, estimates are given of the bias caused by attrition within a single year in estimating average annual expenses. That is, the estimates are of the extent of attrition bias in cross-sectional estimates of average annual expenses. Bias of this sort would affect the results presented in Chapter II.

These estimates can be considered only approximate. As noted above, data on the annual expenses of the attrition sample could only be obtained for the calendar year (1977) before they left the data base. Therefore, it is only possible to estimate the bias that would have been caused had those who left the plan in 1978 been excluded from the analysis in 1977. There is no direct way to calculate the effect their leaving (in 1978) had on the distribution of expenses in 1978 or in subsequent years.

Two methods were used to assess the bias generated by attrition within a single year. The first method compares the average annual expenses in the stable sample to the average in the entire sample, without any adjustment for demographic differences. This provides the higher estimate of the bias caused by a year's attrition. The average annual expense of the stable sample was about $9.50 higher than the $829 average expense of the entire sample. Thus the bias amounts to about 1.1 percent.

The second method of assessing the bias from attrition is to compare the expenses of the stable and entire samples after adjustment for all known demographic differences. This method yields an estimate of bias of about 0.5 percent, about half as large as the estimate of the first method. Concretely, this corresponds to a bias of about $3.75, relative to the average expense of $829.

In practice, the actual attrition bias in cross-sectional analyses reported in this paper is probably close to the lower estimate (0.5 percent), because of the weighting described at the end of this Appendix.

ACCRETION: WHO JOINED THE PLAN, AND HOW MUCH BIAS DO THEY CAUSE?

Patterns of accretion were examined in a way analogous to the analysis of attrition described above, except that different dates had to be used. All contracts that became active in 1977 were compared to those active for all of 1977. Expenses in 1978 were used in the comparison. A total of 16,561 contracts were included in this analysis.

About 7.4 percent of the contracts active during 1977 first became active in that year (see Table B-5). Only about a fifth of all cases of accretion, however, involved families changing from other federal employees' health insurance plans. The remainder were new enrollments--cases in which the contract holder either just began federal employment or had been employed but had previously declined insurance.[3]

TABLE B-5. ACCRETION IN 1977, BY REASON FOR JOINING PLAN AND CALENDAR QUARTER (In percent of total contracts, number of contracts in parentheses)

Reason for Leaving	First Quarter	Second Through Fourth Quarters	Total
Change from Other FEHB Plans[a]	0.7 (108)	0.9 (145)	1.5 (253)
New Enrollment	2.2 (358)	3.7 (614)	5.9 (973)
Total	2.8 (466)	4.6 (759)	7.4 (1,226)

NOTE: Components may not sum because of rounding.

a. "FEHB plans" are federal employees' health benefit insurance plans.

3. As Table B-5 shows, cases in which families had changed from other federal plans were not neatly clustered in the first calendar quarter, when such "open season" transfers are implemented. Many were recorded in the fourth quarter, when the transfers are requested by the employee. It is likely that this is merely a data problem, however, and that most of the changes from other plans are in fact open season changes.

Characteristics of Those Who Joined the Plan

On average, families that joined the plan in 1977 (the accretion sample) had lower expenses than those who were in the plan for the full year (the stable sample). As with attrition, adjusting for demographic differences brought the expenses of the accretion sample more closely into line with the expenses of the stable sample. The two groups in the accretion sample, however--the new enrollments and those transferring in from other federal employees' plans--showed very different patterns of expenses.

The accretion sample as a whole had average annual family expenses about $399 (43 percent) lower than the stable sample in 1978 (see Table B-6). Those who were new enrollees had particularly low expenses--$447 (48 percent) below the stable sample. In contrast, those who changed from other federal health insurance plans had expenses only $184 (20 percent) below the stable sample.

The accretion sample showed a demographic profile similar to that of the attrition sample. In the case of each of the demographic variables in Table B-3, the difference between the accretion and stable samples is in the same direction but larger than the corresponding difference between the attrition and stable samples. Thus, the contract holders joining the plan are, on average, 11 years younger than those in the stable sample, are only 15 percent as likely to be annuitants, are somewhat more likely to be female, and head families that are about 25 percent smaller. Moreover, these demographic differences were substantially more pronounced among new enrollees, whose expenses were also particularly low, than among those changing from other plans.

As in the attrition analysis above, multiple regression was used to disentangle the effects of demographic variables from accretion as such. The specifications used were similar to those used in the attrition analysis.

The adjustment for demographic differences removed most of the disparity between the expenses of the accretion and stable samples. After adjustment, the accretion sample's expenses were only $44 (5 percent) below those of the stable sample (see Table B-7). This discrepancy was too small to be statistically reliable.

TABLE B-6. ANNUAL MEDICAL EXPENSES OF FAMILIES JOINING THE PLAN IN 1977 AND THOSE IN FOR THE FULL YEAR (In 1978 dollars and percentages)

	In For Full Year (Stable Sample)	All Joining (Accretion Sample)	Changed From Other Plan	New Enrollments
1978 Expenses	931	532	747	484
Dollar Difference from Stable Sample	---	-399	-184	-447
Percentage Difference from Stable Sample	---	-43	-20	-48

TABLE B-7. DIFFERENCES IN EXPENSES BETWEEN ACCRETION GROUPS AND STABLE SAMPLE, BEFORE AND AFTER DEMOGRAPHIC ADJUSTMENT (In 1978 dollars and percentages)

	Group		
	All Joining	Changed From Other Plan	New Enrollments
Before Adjustment			
Dollars	-399	-184	-447
Percent	-43	-20	-48
After Adjustment			
Dollars	-44	+32	-68
Percent	-5	+3	-7

NOTE: A minus (-) indicates that the group had lower expenses than the stable sample.

After adjustment, however, the two accretion groups showed quite different patterns. The expenses of the new enrollees were $68 (7 percent) lower than those of the stable sample, while the expenses of those changing in from other plans were $32 (3 percent) higher than those of the stable sample.

While these differences are too small to be statistically reliable, they suggest that the expenses of the accretion sample may represent two effects: a demographic effect and a "pure" accretion effect. The demographic effect is that those who join the plan tend to be in demographic groups that have lower average expenses. This holds true both of new enrollees and of those who change from other federal plans. The "pure" accretion effect--that is, the effect of accretion after taking the limited demographic differences into account--works in opposite directions for the two groups. The new enrollees have a slight tendency to have low expenses, while those who change from other plans have a slight tendency toward high expenses. In the case of those changing from other plans, this constitutes a form of anti-selection, but it is slight and is more than compensated for by the tendency of those changing from other plans to be from low-expense demographic groups.

How Much Bias Does Accretion Cause Within a Single Year?

The bias caused by accretion within a single year was assessed by the same two methods used to estimate the bias caused by attrition. The higher estimate of bias was obtained by comparing the average expenses of the stable sample to the average of the entire sample, without any adjustment for demographic differences. The smaller estimate of bias was based on the same comparison after adjustment for demographic differences.

Before adjusting for demographic differences, the average expense of the stable sample was $931, or 3.2 percent above the average of $902 in the entire sample. Adjustment for demographic factors reduced this bias to about $3.23, or 0.4 percent.

As noted earlier, the actual bias in any given cross-sectional analysis is probably close to the lower estimate (0.4 percent). This is slightly smaller than the bias caused by attrition. The bias caused by accretion would generally compound the bias caused by attrition, but even the two biases together should have little practical importance in most cases.

THE JOINT EFFECTS OF ATTRITION AND ACCRETION OVER TWO AND THREE YEARS

This section assesses the joint effects of attrition and accretion over two- and three-year periods. These effects are those that occur when moving from a one-year cross-section to two- or three-year longitudinal samples. That is, this section assesses the degree to which attrition and accretion cause two- and three-year samples to differ from a one-year cross section. These attrition effects will cause the results in Chapter III (which includes cross-sectional results as context for longitudinal results) to differ from comparable results in Chapter II (which is entirely cross-sectional).

This aspect of attrition and accretion is assessed by comparing three distributions of expenses, considering both average expenses and the incidence of catastrophic illness. The three distributions are:

- the expenses of all contracts active for a full single year (1978);
- the expenses of all contracts active for two full consecutive years (1977 and 1978); and
- the expenses of all contracts active for three full consecutive years (1976-1978).

The first distribution is identical to that which provided the basis for Chapter II, while the second and third distributions were used in producing Chapter III.

Since these analyses are based on the same data that were used in the body of the report, they differ in several respects from those reported earlier in this Appendix. The sample size is much larger, ranging from 110,000 to 127,000 families. Each year's data are inflated to constant 1982 dollars. Families that left the file during a given year because of a "termination" of coverage were included in the data base for that year, but not for any subsequent year. (This decision was based on the fact that terminations include deaths, and excluding them might create a downward bias in cross-sectional estimates of catastrophic illness. In practice, however, including or excluding these cases has no substantial effect.) Each year's data were weighted to a constant (1980) demographic mix. When multiyear samples were used, each family's weights for all relevant years were averaged. Finally, annuitants were excluded.

The joint effect of attrition and accretion is to raise the estimated average expense in both the two-year and three-year samples (see Table B-8). The size of the bias depends on the year but is, as expected, generally larger in the three-year sample than in the two-year sample. Averaging over 1977 and 1978, the average expense in the two-year sample is $1,177, about 4.2 percent higher than the $1,130 average in the one-year sample. Averaging over 1976, 1977, and 1978, the average expense in the three-year sample is $1,203, about 6.5 percent higher than the average in the one-year sample.

A similar, but less consistent, pattern appears in the incidence of high-cost illness: attrition and accretion bias the estimated incidence upward, but the bias is small (Table B-8). For example, the percentage of families exceeding $5,000 in the one-year sample is 5.2; the comparable percentage in the two-year sample is 5.5 in both years, and it ranges from 5.6 to 5.8 in the three-year sample. At higher thresholds (especially at $20,000), the picture becomes less clear, with the direction of bias caused by attrition and accretion seemingly varying from year to year. As noted in Chapter IV, however, the percentage of families exceeding the higher thresholds increased somewhat over the period from 1976 through 1978 (even after adjusting expenses to a constant average), and this trend is confounded with the effects of attrition and accretion in Table B-8. For that reason, the best estimates of the effect of attrition and accretion on the estimated frequency with which families exceed the highest thresholds is obtained by comparing only the 1978 values in Table B-8. Those values show a small but appreciable and consistent bias, with the bias larger, as expected, in the three-year sample.

EFFECTS OF ATTRITION AND ACCRETION ON ESTIMATES OF HISTORICAL TRENDS

The effects of attrition and accretion on the estimates of historical trends in Chapter IV cannot be assessed precisely but are quite small compared to their effects in the two- and three-year samples.

The principal reason why attrition and accretion bias the estimated trends relatively little is that the trend data are based on five consecutive one-year cross-sections, rather than a single five-year sample. That is, all contracts active for all of 1974 (with minor exceptions) were compared to those active in 1975, then to those active in 1976, and so on. Whether a family left the data base during the period 1975-1978, for example, had

TABLE B-8. AVERAGE EXPENSES AND PERCENT OF FAMILIES EXCEEDING CATASTROPHIC THRESHOLDS IN ONE-YEAR, TWO-YEAR, AND THREE-YEAR SAMPLES, BY YEAR (In 1982 dollars)

Sample (Year)	Average Expense	Percent Exceeding Thresholds			
		$3,000	$5,000	$10,000	$20,000
One-Year					
1978 expenses	1,130	11	5.2	1.7	0.48
Two-Year					
1977 expenses	1,174	11	5.5	1.6	0.43
1978 expenses	1,180	11	5.5	1.8	0.52
Three-Year					
1976 expenses	1,182	11	5.6	1.7	0.41
1977 expenses	1,199	11	5.6	1.7	0.41
1978 expenses	1,227	11	5.8	1.9	0.56

no bearing on its inclusion in the 1974 data base. Accordingly, the attrition and accretion biases (described in the previous section) generated by the use of multiyear samples are not germane.

Moreover, the five cross-sections used in Chapter IV were each weighted to a constant demographic mix. As noted earlier in this appendix, this removes much of the bias caused by attrition and accretion within single years.

HOW WERE ATTRITION-RELATED DEMOGRAPHIC FACTORS CONTROLLED IN THIS REPORT?

Possible attrition and accretion bias attributable to known demographic variables was controlled primarily by weighting each year's data to represent a constant demographic mix: the 1980 population of families with non-elderly heads employed full time and earning at least $7,200 annually (see Appendix A).

The weighting did not include one variable used in the attrition/accretion analysis: annuitant status (employee vs. employee annuitant vs. survivor annuitant). Annuitant status was handled by excluding all annuitants from the analyses. This was done because the annuitant group includes, among others, individuals who, if they had previously been employed in the private sector, would be receiving disability benefits. Since such people are affected by entirely different health policies than the employed population, it was desirable to exclude them. The lack of any method for distinguishing them from other annuitants, however, made it necessary to exclude all annuitants. As a result, the disproportionately low number of annuitants in the attrition and accretion samples cannot cause any attrition- or accretion-related bias.

This weighting process provides better protection against demographically-related attrition and accretion bias in some types of analysis than in others. In cases where various yearly samples are compared, the attrition/accretion effects of the measured demographic variables are entirely removed. An example is the analysis which used separate yearly samples to examine whether catastrophic expenses are becoming more common (Chapter IV). In analyses that could not use the separate yearly samples, on the other hand, some attrition and accretion bias resulting from demographic factors would remain. For example, the analysis of the subsequent expenses of families having catastrophic expenses in a given year (Chapter III) could only be done on a sample consisting of contracts active in both of the years involved. In these analyses, each family weight was usually an average of its weights for each of the two years. This is a less complete control for demographic factors, and some of the attrition/accretion effect discussed above under "Joint Effects of Attrition and Accretion Over Two or Three Years" is thus attributable to demographic factors.

APPENDIX C. EXPENSES OF ATTRITION AND ACCRETION SAMPLES, INCLUDING MENTAL HEALTH CLAIMS

Because the analyses reported in the body of this paper exclude mental health claims, the appropriate way to assess attrition and accretion bias is likewise to exclude mental health claims when describing the characteristics of the attrition and accretion samples. That was the approach taken in Appendix B.

Some have asked, however, whether the characteristics of the attrition and accretion samples would have been different if mental health claims had been included. Although they are not directly pertinent to the question of attrition bias in this report, tables addressing that issue are provided here.

ATTRITION

Inclusion of mental health claims has no substantial effect on the differences between the stable and attrition samples. Thus Tables C-1 and C-2 here are basically the same as Tables B-2 and B-4 in Appendix B. (The claims for all groups are higher in Tables C-1 and C-2, reflecting the addition of mental health expenses.)

ACCRETION

Addition of mental health claims has one effect on the comparisons between the stable and accretion samples. Without mental health claims, those changing into the Blue Cross plan from other plans showed claims about 20 percent lower than the stable sample (Table B-6). After controlling for demographic differences, this group shows expenses very slightly (3 percent) above those of the stable sample. In contrast, if mental health claims are added, this group shows expenses 4 percent above those of the stable sample (Table C-3), and adjustment for demographic differences increases this difference to 15 percent (Table C-4).

TABLE C-1. ANNUAL MEDICAL EXPENSES, INCLUDING MENTAL HEALTH, OF FAMILIES LEAVING THE PLAN IN 1978 AND THOSE REMAINING (In 1977 dollars and percentages)

	All Remaining (Stable Sample)	All Leaving (Attrition Sample)	Changed to Other Plan	Terminated	Other
1978 Expenses	$921	$703	$589	$813	$676
Difference from those remaining	---	-218	-332	-108	-245
Percentage difference from those remaining	---	-24	-36	-12	-27

TABLE C-2. DIFFERENCES IN EXPENSES, INCLUDING MENTAL HEALTH, BETWEEN ATTRITION GROUPS AND STABLE SAMPLE, BEFORE AND AFTER DEMOGRAPHIC ADJUSTMENTS (In 1977 dollars and percentages)

	Group			
	All Leaving	Changed to Other Plan	Terminated	Other
Before Adjustment				
Dollars	-218	-332	-108	-245
Percent	-24	-36	-12	-27
After Adjustment				
Dollars	-94	-234	+118	-195
Percent	-10	-25	+13	-21

TABLE C-3. ANNUAL MEDICAL EXPENSES, INCLUDING MENTAL HEALTH, OF FAMILIES JOINING THE PLAN IN 1977 AND THOSE IN FOR THE FULL YEAR (In 1978 dollars and percentages)

	In for Full Year (Stable Sample)	All Joining (Accretion Sample)	Changed from Other Plan	New Enrollments
1978 Expenses	$1,014	$658	$1,059	$564
Dollar Difference from Stable Sample	---	-356	+45	-450
Percentage Difference from Stable Sample	---	-35	+4	-44

TABLE C-4. DIFFERENCES IN EXPENSES, INCLUDING MENTAL HEALTH, BETWEEN ACCRETION GROUPS AND STABLE SAMPLE, BEFORE AND AFTER DEMOGRAPHIC ADJUSTMENT (In 1978 dollars and percentages)

	Group		
	All Joining	Changed from Other Plan	New Enrollments
Before Adjustment			
Dollars	-356	+45	-450
Percent	-35	+4	-44
After Adjustment			
Dollars	-29	+151	-86
Percent	-3	+15	-8

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APPENDIX D. PROTECTION FROM CATASTROPHIC MEDICAL EXPENSES UNDER EXISTING EMPLOYEE INSURANCE PROGRAMS[1]

Over the past several years, the Congress has considered many proposals to protect people from catastrophically large health-care expenditures. Several of the more recent proposals would guarantee such protection for the employed population by requiring employers to provide insurance limiting individuals' or families' liability for medical expenses to a legally specified maximum. The most recent example is H.R. 850--the Gephardt-Stockman National Health Care Reform Act of 1981; although not requiring employers to offer health insurance, it provides that any such insurance must limit the insured family's liability.

This section examines the effects such a proposal would have on persons with existing employment-related health insurance. Three catastrophic mandates are analyzed that limit the liability of families to $3,500, $2,500, or $1,500 per year, in 1980 dollars. To assess the effects of these three plans, it analyzes the coverage of large expenses under existing insurance in comparison with coverage under the plans. Because of data limitations, the analysis was limited to private, for-profit employers. The major findings are:

- Employees with employment-related coverage now have, on average, good coverage of large medical expenses. For example, the average plan reimburses 92 percent of the covered expenses of an individual with annual expenses between $9,000 and $20,000 (see Table D-1).

- Because of the generally good coverage of large expenses, as well as the rarity of such expenses, none of the catastrophic mandates analyzed here would have a large effect on average benefits or premiums.

- Nonetheless, a relatively small proportion of covered employees--those with high expenses and relatively weak existing coverage--would receive major benefits from a catastrophic mandate.

1. Adapted from Protection From Catastrophic Medical Expenses: The Effects of Limiting Family Liability Under Existing Employee Insurance Programs, Congressional Budget Office Staff Working Paper, (August 1981).

In addition, some catastrophic mandates would provide additional reimbursement to some people with chronic conditions or unstable employment, by eliminating provisions in many current health insurance plans that limit payment for conditions that existed before the beginning of employment.

These conclusions do not necessarily apply to the entire employed population, because the insurance protection of those excluded from this analysis may not be comparable in all cases to that of those included. This analysis reflects the insurance protection of about half of all employees in establishments of 25 or more employees and that of a lower proportion in smaller establishments, as well as of an unknown number of employees covered by virtue of being a spouse or child of one of the employees included in the analysis. The average depth of coverage for all those excluded from the analysis cannot be assessed. The excluded groups include employees with no current protection; some groups, such as agricultural workers, that probably have ayptically weak coverage; and other groups, such as federal employees, that have very thorough protection.

Existing catastrophic coverage is weaker in some industries than in others, but the variation among industries is small. Most are so similar in their average catastrophic coverage that three different measures of the effect of catastrophic mandates--the cost per employee of compliance, the proportion of employees receiving additional reimbursement in a single year, and the value of the additional reimbursement--failed to provide a consistent ranking of industries.

The exception to this pattern of uniformity is the service industry (for example, hotels, repair services, legal services, health services, and social services). This industry has substantially weaker catastrophic coverage under existing insurance and would accordingly be affected more by a catastrophic mandate. The typical cost of compliance in this industry would be from three to four times the average. The proportion of workers in this industry who would receive increased benefits would be three times the average, and the amount of their additional reimbursement would be 30 to 40 percent greater than the average.

An unexpected finding was that the size of existing insurance plans--that is, the number of individuals covered--has little bearing on the adequacy of catastrophic coverage or on the impact of a catastrophic mandate. The largest plans--those with over 25,000 participants--have slightly more thorough coverage of catastrophic expenses and accordingly would have lower costs in complying with a catastrophic mandate. Otherwise, however, the size of the existing plan was found to be largely irrelevant.

TABLE D-1. AVERAGE BENEFIT RATIO AT DIFFERENT LEVELS OF ANNUAL EXPENSE, PLANS OF PRIVATE, FOR-PROFIT EMPLOYERS

Expense Level (1980 dollars)	Number of Workers	Average Annual Expense (dollars)	Average Benefit (dollars)	Average Benefit Ratio[b] (percent)
0	14,732,625[a]	0[a]	0	0
1-100	4,527,230	53	26	49
101-200	3,739,745	146	66	46
201-300	2,110,582	246	128	52
301-400	1,303,969	346	207	60
401-500	822,553	448	292	65
501-600	567,498	548	381	69
601-700	411,276	648	472	73
701-800	325,195	748	567	76
801-900	258,243	851	665	78
901-1,000	258,243	952	770	81
1,001-1,100	188,103	1,052	862	82
1,101-1,200	207,232	1,148	957	83
1,201-1,300	153,033	1,251	1,047	84
1,301-1,400	153,033	1,351	1,150	85
1,401-1,500	137,092	1,453	1,243	86
1,501-1,600	102,022	1,551	1,342	87
1,601-1,700	102,022	1,653	1,438	87
1,701-1,800	102,022	1,753	1,533	87
1,801-1,900	86,081	1,852	1,624	88
1,901-2,000	86,081	1,955	1,732	89
2,001-2,500	325,195	2,241	1,992	89
2,501-3,000	223,173	2,746	2,465	90
3,001-3,500	153,033	3,245	2,939	91
3,501-4,000	121,151	3,745	3,394	91
4,001-4,500	102,022	4,265	3,880	91
4,501-5,000	86,081	4,766	4,351	91
5,001-6,000	121,151	5,475	5,012	92
6,001-7,000	86,081	6,501	5,590	92
7,001-8,000	51,011	7,488	6,863	92
8,001-9,000	35,070	8,493	7,768	91
9,001-10,000	35,070	9,577	8,796	92
10,001-12,500	51,011	11,058	10,159	92
12,501-15,000	35,070	13,689	12,579	92
15,001-17,500	15,941	16,169	14,920	92
17,501-20,000	15,941	18,752	17,186	92
Over 20,000	51,011	33,297	30,433	91
Total	31,881,896	438	364	83

a. An unknown percentage of people with small annual expenses report zero expenses. Therefore, some of those listed as having no expenses should ideally be distributed over the next several intervals. This does not affect estimates of coverage at higher levels.

b. The benefit ratio is the percentage of expenses paid by the insurer.

APPENDIX E. WHO HAS HIGH MEDICAL EXPENSES? THE EFFECTS OF AGE AND SEX

Some families are more at risk of high-cost illness than are others. This Appendix examines the relationships between medical expenses (in 1982 dollars) and the age and sex of the contract holder.

Age

Increasing age produces higher medical expenses, and this is reflected both in families' average annual expenses and in their probability of incurring particularly high expenses.

When the focus is on expenses of entire families, the relationship between age and high-cost illness is complex. For example, one family member may be entering an age of increased vulnerability at the same time that another is entering a time of lowered vulnerability. To simplify these patterns, the following analyses focus on the age of the contract holder.[1]

Average Expenses. Average family expenses increase with age over the entire age range considered. The increase in expenses, however, becomes steadily smaller with increasing age[2] (in Figure E-1, note how the curve "flattens out" somewhat at higher ages).

This pattern reflects more than the simple effect of the aging of the family's members. It also reflects other changes that accompany age, such as changing family size. When three demographic factors (region, sex of contract holder, and family size) are held constant, the effect of age on average expenses is

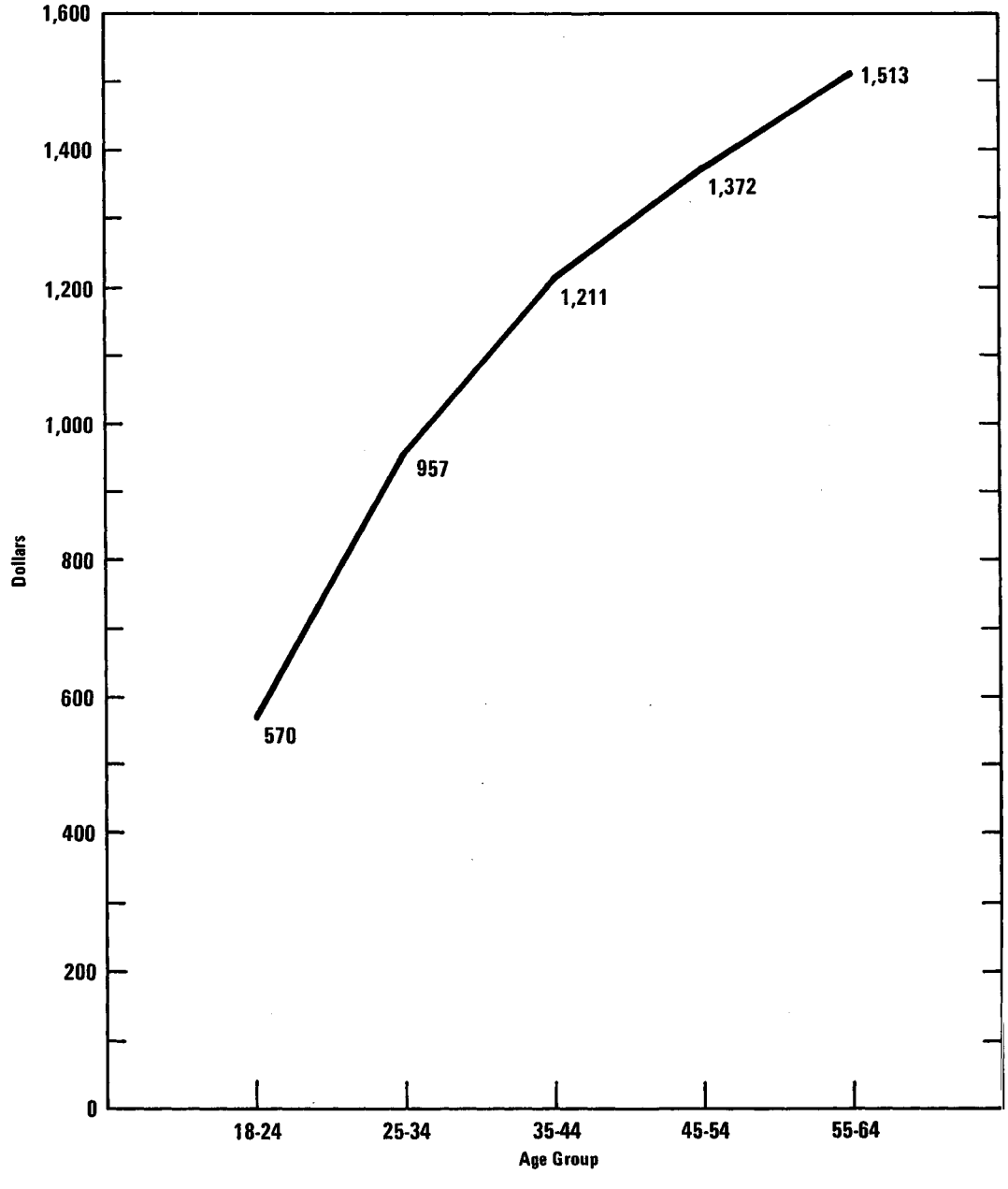
---

1. Because the age of the contract holder is not a simple measure of age, it is less strongly related to expenses than is the age of individual people. Thus, when the analyses described below were repeated with only self-only contracts included, the relationships between age and expenses were found to be generally stronger than those reported below.

2. It is important to recall that this analysis does not consider the elderly, and the pattern described here may not apply to ages over 65.

Figure E-1.

Annual Expenses by Age of Contract Holder



very different: expenses decline between the 25-34 and 35-44 age groups but increase both before and after those ages (see Figure E-2).

The Frequency of High-Cost Illness. Age also increases the incidence of high-cost illness. In proportional terms, the increase in particularly pronounced when higher thresholds are used (see Table E-1). For example, the proportion of families exceeding a $5,000 threshold almost doubles between the 25-34 and 55-64 age groups, and the proportion exceeding a $20,000 threshold increases four and a half times over that same age interval.

The effect of age on the incidence of high-cost illness is not consistent across the age range, and it varies depending on the threshold of expenses. As a general rule, the higher the threshold, the older the age at which the most rapid increase in high-cost illness occurs. For example, if a $3,000 threshold is used, the most rapid increase in the incidence of high-cost illness occurs between the 18-24 and 35-44 age groups (see Table E-1). In contrast, if a $20,000 threshold is used, the most rapid increase occurs after the age of 44. This is shown graphically in Figure E-3: the incidence using a $5,000 threshold slopes up sharply at the younger age ranges, while the incidence using a $20,000 threshold slopes upward most sharply at the upper end of the age distribution. The pattern using a $10,000 threshold is intermediate.

TABLE E-1. PERCENT OF FAMILIES EXCEEDING THRESHOLDS OF ANNUAL EXPENSE, BY AGE OF CONTRACT HOLDER

Level of Expense	Age Group				
	18-24	25-34	35-44	45-54	55-64
$ 1,000	14	23	27	26	26
$ 3,000	5.7	9.6	12	12	13
$ 5,000	2.1	4.0	5.7	6.8	7.5
$10,000	0.58	0.99	1.6	2.3	3.3
$20,000	0.20	0.25	0.32	0.72	1.11

Figure E-2.

Expenses by Age of Contract Head, Controlling for Sex, Family Size, and Region